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The role local initiatives in community based disaster risk management in Kemijen, Semarang City

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Abstract. Community-based disaster risk reduction is one of the homegrown initiatives efforts and community empowerment oriented in disaster management. This approach is very important because no one can understand the conditions in a region better than the local communities. Therefore, the implementation of CBDRM always emphasize local initiatives in decision making. The existence of local initiative is necessary specially to anticipate the impact of climate change which is increasingly affecting towns in coastal areas, including settlements in Semarang. Kemijen Urban Village is one of the informal settlements in Semarang, which has the highest intensity of flood that is 12 times during 5 years (2011-2015). The research question is how the level of local initiatives in flood disaster management in Kemijen, Semarang? This study aims to assess the level of local initiatives in Kemijen as the community adaptive capacity of flood prevention in pre-disaster, emergency response, and post-disaster. Local initiatives assessed on water supply, sanitation, food, shelter, health, drainage maintenance and waste management. This study shows the level of local initiatives in pre-disaster and post-disaster is almost same and bigger than the response phase. Scoring results showed that pre-disaster is 35.002, 27.9577 for emergency response, and post-disaster is 34.9862 with each category that is independent, empowered, and independent. This study also shows that local initiatives in Kemijen largely formed by individual initiative and only a few were formed by a collective initiative.

1. Introduction

In recent years, the impact of climate change is increasingly affecting the cities in coastal areas. This is a result of unplanned urban growth, especially the increase of informal settlements occurs in large scale in the coastal areas (World Bank, 2012). The growth of informal settlement growth phenomenon occurs in cities in developing countries, including Indonesia (Sariffuddin, Astuti, Farhaeni, & Wahdah, 2017). As unplanned neighborhoods with the heterogeneity of society, the village has problems such as poor quality of the houses, where public space is minimal and the quality of public spaces is low and the legality of land (Kencana & Yuliasuti, 2016). Living in informal settlements makes people more vulnerable to climate change. Public vulnerability is compounded by the very limited resources, inadequate infrastructure, and weak institutional systems weak and ineffective (Ayers, 2011; Danianti & Sariffuddin, 2015). It shows that living in informal settlements is particularly at risk for experiencing a loss in the face of disaster. The ability of communities in disaster risk management is necessary especially in the informal settlements that are vulnerable to disasters. Disaster risk management is a systematic approach to reduce vulnerabilities and risks, and to strengthen disaster resilience (Jörn Birkmann & von Teichman, 2010).

In 2011, extensive tidal inundation in Semarang amounted to 1538.8 ha, it spreads over 8 out of 16 districts. One the district is the Eastern District of Semarang with an area of 44.15 ha reaches tidal



inundation, tidal inundation area was just scattered in the Kemijen (Ramadhany, Subardjo, & Suryo, 2012). Kemijen also has the highest intensity of flood in the city of Semarang with 12 times the incidence during the period of 5 years (2011- May 2015) (Nugroho, 2013). However, these conditions do not make public to avoid staying in the Kemijen village and chose to remain in the region for various reasons such as economic constraints. For further information, most people in Kemijen about 45% are as industrial workers whose earn the regional minimum wage (UMR) of Semarang.

Adaptability to reduce disaster risk at the local level is necessary (Sariffuddin & Wijaya, 2014). Since Kemijen community feel and direct observe themselves, so that they can understand the condition of the region especially related to the disaster. It's important to associate the risk of flooding with initiatives related to adaptation to climate change, and the specific issues of urban planning and management, such as the construction of infrastructure and provision of basic services (World Bank, 2012). Local initiative itself is also included in one of the core elements proposed by Fujikake (2008) in an awareness empowerment. All the steps and the activities carried out in PRBBK are based on the process of awareness planned (Nakmofa & Lassa, 2009). Therefore, this local initiative is part of a community-based disaster risk reduction. These local initiatives need to be explored in Kemijen Village community as one of the capital to improve adaptability in disaster management. Taking consideration on those issues, this study was conducted to answer the research question "What level of local initiatives in the prevention of flooding in the Kemijen?" The aim of this study is to assess the level of local initiatives in Kemijen village as the adaptability of the public in flood prevention in three stages of disaster, namely the pre-disaster, emergency responses and post-disaster.

2. Methodology

This study focused on the role of the community in the initiative for disaster management based on aspects of the Sphere Project in three stages of a disaster, according to the issues that have been formulated in this study. The Sphere Project's aspects used as a study variable are namely the water supply, sanitation supply, food supply, provision of shelter/transitional shelters, health care provision and rescue, drainage maintenance and waste management (Sphere, 2011). This research applied quantitative research methods. The sampling technique used was Probability Sampling with random sampling technique. The samples technique was done by assuming one representative family in Kemijen as one respondent. Furthermore, this study used the Slovin formula in determining the number of samples with a tolerance limit of 10% or 90% level of accuracy. So that it can be claimed that this study used 98 families.

Descriptive statistical was used to describe the results of data processing which is then presented in of charts, graphs, and maps. To determine the level of local initiatives, this study used scoring function to assess the criteria listed in each indicator by using Likert scale. The weight of the score for each indicator is based on the number of indicators in each variable, so that the total score is well distributed and balanced.

3. Results and Discussions

3.1 The Analysis of Kemijen Community Characteristics.

This analysis describes the conditions of the community that contains two things: the socio-economic characteristics of society which include level of education, livelihood, income levels and characteristics of local institutions in the form of formal institutions and informal (community) in the local level relating to development and disaster in the Kemijen village. Marfai (2008) and Sariffuddin and Wijaya (2014) described the socio-economic characteristics of the local community as one of the key factors that affect disaster response measures.

3.2 Community Socioeconomic Characteristics.

This aspect is about the level of education and economic conditions as seen from livelihood and income levels in Kemijen. *Income level.* General overview on community's education level in Kemijen is low. It is proved from the population with 36% are primary school graduates, further, there are also the population who do not complete primary school so that the total percentage of both at 44%. The level of education is one of the important indicators which show the quality of the population in Kemijen. The low level of education affects the livelihood and their income, therefore Kemijen village is dominated by the workers. The level of education also influences in disaster relief efforts, because of insight or knowledge affects how people think and take the initiative before they undertake the necessary measures for disaster mitigation in Kemijen.

Economic Conditions. The majority of the population in Kemijen are low-income communities (MBR) or below Rp 2.100.000, - per month with a percentage of 84%. It can be seen that generally people work as laborers in the amount of 51%. It is in line with the level of education of the people. Moreover, based on monographs data, there are 1,340 households included in poor communities. This condition makes people choose to in rural areas. Low income level which indicates poverty in Kemijen makes people vulnerable to floods.

3.3 Analysis of Local Institutions.

The local agency in Kemijen village consists of formal and informal institutions (community). One of the characteristics of the local institution is the existence of collective consciousness, as mentioned by Joern Birkmann, Chang Seng, and Setiadi (2012). The explanation strengthens that community-based disaster risk reduction is related to the concept of community empowerment, in which one of its core elements is awareness.

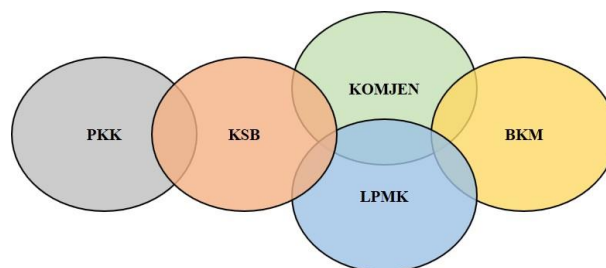


Figure 1. Interrelationship Local Institutions in Sub Kemijen

Figure 1 illustrates the inter-agency coordination mechanism in disaster management. The agency which does not have bound or coordination is directly shown in circles that do not intersect. PKK (Family Welfare Guidance) relates to the KSB Group (Disaster prepared Group) in disaster relief only on emergency response that helped the establishment of a common kitchen. Further, BKM (Community Self-Reliance Agency) is not directly related to KSB, since BKM only concerned on development in Kemijen village, but in fact the construction itself is also part of disaster management. Commissioner General (Kemijen's Community) and LPMK (Urban Village Community Empowerment Organization) is related to both KSB and BKM because they are equally helpful in terms of development as well as contribute to the disaster management program undertaken by KSB. There is a concern issues that the member of KSB, Komjen, LPMK are the same people. They are the ones who are really concerned about the environment in Kemijen.

3.4 Local Initiatives Analysis in Flood Prevention Needs Supply.

This analysis will discuss indirectly how local action and local knowledge contained village Kemijen as part of a local initiative in flood disaster management in Sub Kemijen associated with the provision of

clean water, sanitation, food, shelter/ temporary shelter, medical services and rescue, as well as drainage and solid waste management.

3.5 Water Supply.

Clean water sources used by Kemijen's community are same at three stages of disaster. As many as 72% of people in Kemijen are using PDAM (Municipal Waterworks) water and 14% are using wells water. Those who use well water said that they cannot use PDAM water because it is difficult access in the installation, so the installation will be more expensive, especially if the installation is not done at the same time. Seeing these conditions, there is one person in Kemijen initiative in the provision of clean water as well be big opportunity for him becoming a distributor of clean water. The result is amounted 14% of people in Kemijen buy clean water from this distributor. To see the service area, see Figure 2.

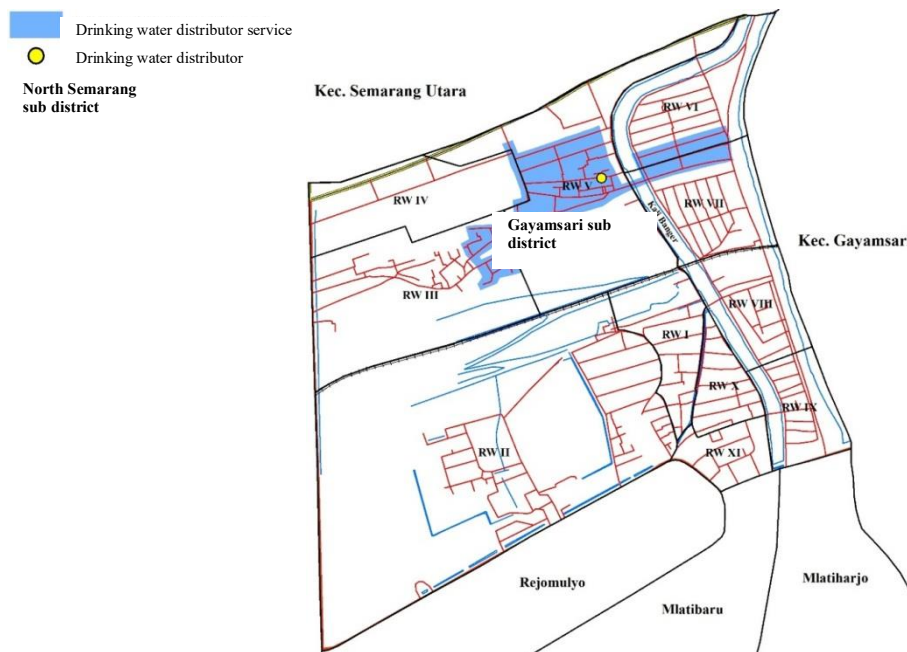


Figure 2. Water supply services from the distributor

Other issues come up related to the clean water supply and the water is turbid. However, people have been thinking over on these issues. They take the water in a container and then wait the dirty go down so that the clean water is in the top, then they consume it. On the other hand, people who are lack of water supply initiate to accumulate the water, so that it can be used whenever they need it. Generally, all the initiatives in this variable are the individual initiative, while the collective initiative has not been seen in the provision of clean water. It is not in line with what Nakmofa and Lassa (2009) said about.

3.6 Provision of Sanitation.

More than 94% of community already have private toilets in their house that, while 6% of the people do not have private toilets. Those who do not have private toilets said that they could not able to build a septic tank and private toilets for sanitation purposes, therefore they use communal toilets. To see the spread of communal toilets can be seen in Figure 3.

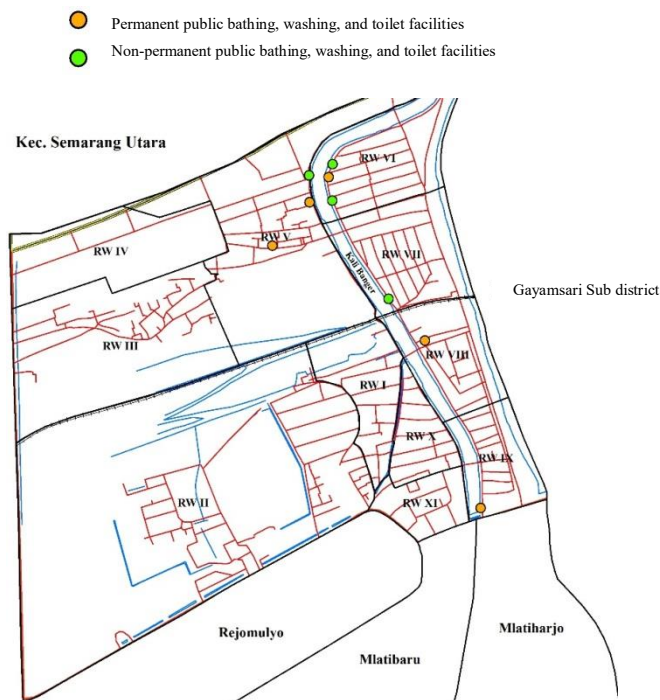


Figure 3. Distribution of communal toilets.

Since there are many people still do not have private toilet, it drives the community to ask the government to build communal toilets for them. All communal toilet construction was done by the people, but the financial resources were from the government, private sector and the community. Usually the government funds a kind of permanent toilet, while the community build semi-permanent toilet.

3.7 Food Supply.

The provision of food in disaster relief is needed, especially in the emergency response phase. Many people died because of the lack of food supply instead of disaster. The availability of food in the Kemijen in pre-disaster stage, disaster response and post-disaster is 100%, ready, so that people feel save.

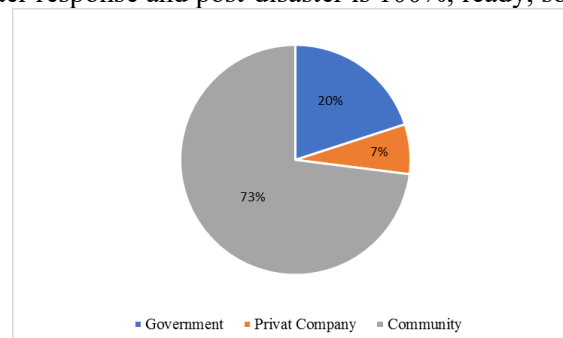


Figure 4. Food Source Provider in Response Stage.

Figure 4 describe some people said when the disaster came, they got help such as rice packs and groceries, some argue the government gave 20% from total assist, and some others argue the private sector (such as the student community) gave 7%, while 73% were from community itself. Furthermore, the community claimed that the food is eatable. In response phase, 38% of the community believes that there is a common kitchen, but most or about 62% of the community did not know these public kitchens.

It is proved that the community has awareness to provide public kitchen in disaster response stage. However, it still needs to tell anyone that public kitchen is available.

3.8 Provision of Housing / Temporary Shelter

Figure 5 show the majority or 53% of the people stated that they did not find any evacuation place when disaster or emergency response coming, while 47% of people found the evacuation point. However, most people said that they prefer to stay at home when flood coming, because they think that they were safe and no need to move to evacuation point. However, at least they have collectively initiated to provide evacuation site.

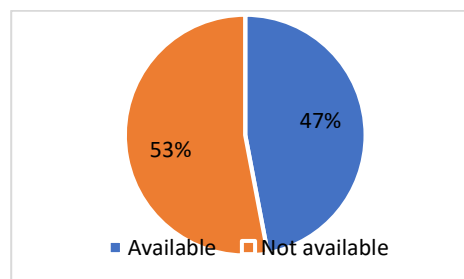


Figure 5. Points Evacuation Response Stage.

However, in 2014 there were houses which affected severely because of the water entered the house and reached 1-1.5 meters. Since this was the only low house that still exist in Kemijen. The evacuation point was selected in other community's houses in Kemijen.

3.9 Provision of Health Care and Rescue

Most people claimed that the disaster volunteers were not available in Kemijen, in fact the KSB also serves as volunteer evacuation, because they were trained directly by BPBD. It indicates that the socialization and information related to KSB is less spread in the community or the possibility that KSB is less active in Kemijen. The community did not know that the emergency kits were available by the BPBD and KSB. Furthermore, the community also did not have any emergency kits for disaster response.

To view the provision of health services can also be viewed on the availability of medical personnel that is provided in Kemijen village. If we see from the third stage of the disaster, the community said that the medical personnels are available most in the response phase, it was about 29%. This is also supported by statements from some respondents who said medical personnel from health centers checked the condition of the people when the floods come. The head of village also still communicate each month to the health center. As for the pre and post disaster medical personnel also played a role in checking larvae associated with jumantik program initiated by the PKK, but jumantik program is less useful related to disaster management.

3.10 Drainage Maintenance.

Most of the people or about 88% of all community still do routine activities for drainage maintenance. 24% of the people do drainage maintenance once a week, while 76% of the people do it every few weeks. In the emergency response stage, community does not do drainage maintenance. Since when flood comes the drainage system can not hold the water flow. However, there is still drainage management during emergency response by using a pump provided by the government. The existence of the government's pump has been very helpful to reduce flood water in Kemijen Village

neighborhoods. Thus the public also believes that the floods in Kemijen (although the high level is about 50cm) can recede within 3-4 hours.

In Figure 6, the drainage condition can be quite good if the puddle is not high and clean of trash. The sufficient drainage condition is the inundation moderate to high, and there is garbage, but not too much. As for the poor drainage condition can be described as the inundation is height and a lot of garbage. Drainage condition also describes whether people actually performing maintenance on drainage in their neighborhoods. If you see the previous explanation, the percentage of availability of routines for maintenance of drainage by 88%, but the poor drainage of 16% and a considerable 40%. It indicates that there are some people who do not actually carry out routine maintenance of drainage or they do it unoptimally. It is also likely that there are other factors for their closed drainage makes people difficult to perform drainage maintenance.



Figure 6. Drainage condition.

Figure 6 also shows the image of a closed drainage. Communities whose their settlement environment found a closed drainage said that their closed drainage (the fund is from the government) makes them difficult to clean up the drainage. The purpose of the government or private sector that might be good to use as a drainage well as for the roads and that not a lot of incoming waste. However, it is less good for people, they think that because it is difficult to clean, the deposition of sand or soil in the longer drainage will be higher, it would make drainage more shallow and easily overflow.

3.11 Waste Management.

Garbage disposal system located in the Village Kemijen remained the same at each stage of the disaster. Most people has good enough disposal system with a percentage of 81%. There is even a small portion of the community or 3% who has waste recycled system. It proves that there are some people in Kemijen who have the initiative in waste management. However, there is also a carelessly discarded waste management or about 16%, they do not have a trash can or they have lower awareness to throw garbage properly. Most available trash cans are provided by the community, while 32% of trash cans are given by the government and 9% are assistance from the private sector. The trash cans from the government are quite good, because the trash cans are divided into two, for organic and non-organic garbage.



Figure 7. Waste Systems.

Kemijen society who prefers to transported their garbage must pay a fee of 4000-6000 Rupiah per month. The transportation is done once in three days, three days or twice a week. This system is actually good, but unfortunately the final disposal of the transport of the garbage is dumped on vacant land that distance is still very close to the settlement. This is due to the unavailability of polling stations in Kemijen, so that makes this village became slum garbage as shown in Figure 7. It will not be surprised if Kemijen village established as one of the slums in the city Semarang and frequent flooding. The dustbin aid program is very helpful for Kemijen society, but it would be better if the government provides assistance related to the provision of TPS (polling station), because the dustbin assistance program will be less effective if the polling station in Kemijen is yet available. Waste management by communities, sometime become to a source of social conflict due to unregulated management system.

3.12 Analysis of Local Initiative on Floods.

After doing the calculations scoring for each respondent, then the whole question added up in order to get the total score at each stage of the disaster. The total score will be categorized based on the level of empowerment in the context of disaster management. So it can be formulated whether people in Kemijen seen from initiative at three stages of disaster, namely, pre-disaster, disaster response and post-disaster included in the category of powerless, capable, independent, or civil. Table 1 show the scoring result of the level of local initiatives Kemijen Village community in disaster management.

Table 1 Scoring results of local initiatives Village Kemijen

Variable	Pra Disaster	Emergency Response	Post Disaster
Water Supply	55,1633	54,1224	54,8571
Provision of Sanitation	55,7755	55,3469	55,5306
Food Supply	46,5306	49,8571	46,8367
Provision of Housing / Temporary Shelter	0,0000	13,5612	0,0000
Provision of Health Care and Rescue	4,0408	5,2653	4,6531
Drainage Management	38,5459	0,0000	38,0867
Waste Management	44,9592	17,5510	44,9388

Variable	Pra Disaster	Emergency Response	Post Disaster
Total	35,0022	27,9577	34,9862

The total scores of local initiatives when categorized based on the level of empowerment in the context of disaster management at the three stages of a disaster, the result is Kemijen community is powerless in the stage of the emergency response. Category helpless still considered unfavorable because it signifies that the community as a whole still depend on government and private sector, so that society is less visible initiatives in this stage. As for the pre and post-disaster, community is in independent category. Independent category is assessed quite well in this stage, because it indicates that the ma of people have initiative in making or proposing a program and to apply, besides the public have also been able to access and maximize existing resources.

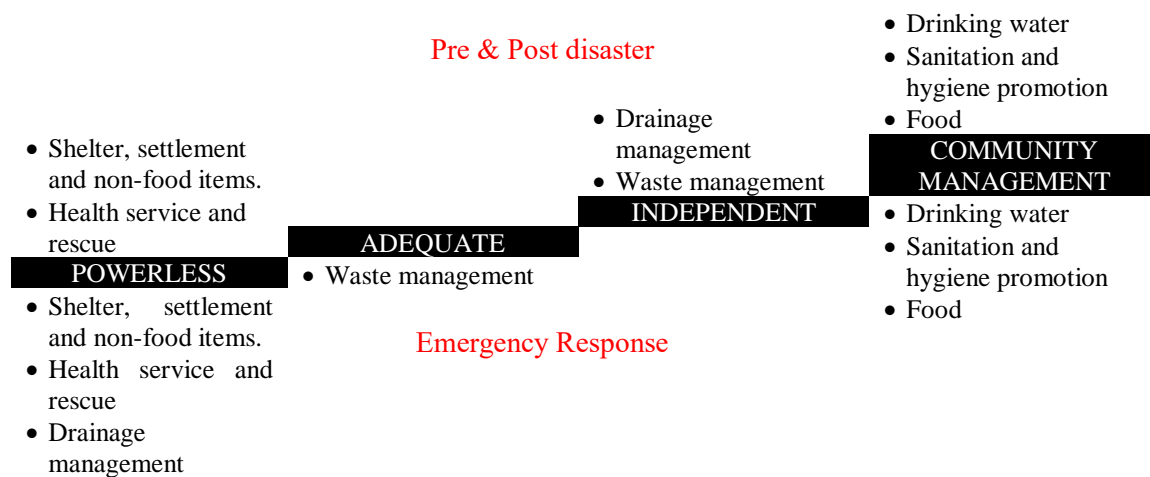


Figure 8. Community Empowerment Study on Pre-disaster, Emergency Response Stage and post-disaster

In Figure 8 tells the categorization of the variables in the response phase which shows that the people in Kemijen with the initiative in the provision of clean water, sanitation, and food in emergency response at the level of civil. The community has been very good at providing these variables. Besides, the local waste management initiatives are still at the level of helplessness. People still need to improve their initiatives in waste management, during this garbage is also a problem that is quite large in Kemijen village. Community initiatives seems weak on providing shelter/temporary shelter, medical services and rescue, and drainage maintenance due to fall into the category of helplessness. When it is linked with the socio-economic characteristics of society, it the level of local community initiatives at the level of civil until helpless is not distinguished by special characteristics. One of the factors affecting the level of local initiatives is society's active engagement in disaster management forums and activities. When they do it collectively, it will indirectly increase the level of initiative, meaning the ability of self-help in disaster response is relatively smaller than the ability of community-help. The knowledge of disaster management is not largely arise from self-help, but community-help, it can be referred to local knowledge. Still in Figure 8 categorization of variable level assessment of local initiatives at pre-disaster and post-disaster stage are put together in one picture because it has almost the same results. It can be seen from the community's mindset about the different stages of a disaster with what is found in the literature, see Figure 9. Some people think that there are only two phase in disaster process, disaster and no disaster. It is supported by the results of the analysis and scoring, it only shows that pre-disaster and post-disaster are merely the same. Therefore, KSB as institutions of local level disaster in Kemijen needs to disseminate to the public related to the disaster, so that people at least know the basics of disaster management.

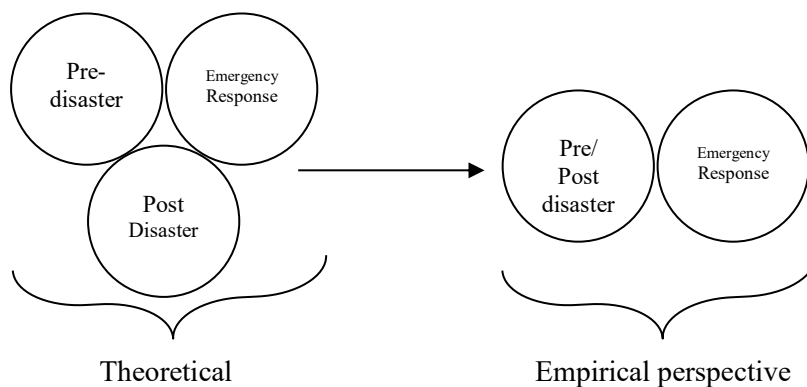


Figure 9. The different Disaster stages between Regulation and Community's opinion

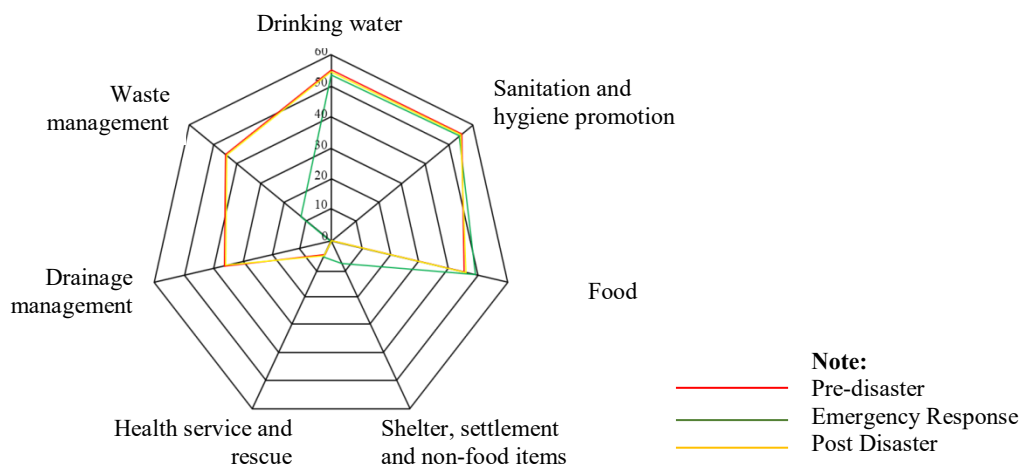


Figure 10. Model Level of Local Initiative in Kemijen.

Modeling in Figure 10 makes us easy to view and compare the variables which are being assessed by local-level initiatives, such as pre-disaster and post-disaster stage that has almost the same score. It points out that the majority of local community initiatives more focus on meeting the daily needs, while local knowledge and local action in disaster response is less visible to the public. It can be seen from the variable of disaster response, but it is less related to the fulfillment of their daily needs, the variable provision of shelter/temporary shelters and the provision of health care and rescue. There are indications that the disasters did not significantly affect the people's lives.

4. Conclusions

The overall level of local initiatives in Kemijen included in self-help category at post-and pre-disaster stage, which means generally community can meet their needs in accordance with the initiative by utilizing the existing resources. The community already has initiative in making or proposing a program and applying it, though the government and private sectors still give assistance. On the other hand, response stage of the community included in capable category, which means that the community still needs assistance in responding flood disaster, although the community itself is capable to optimize what they get. Results of assessment on the level of local initiatives at pre-disaster and post-disaster stage have the same results in all the variables. It can be seen from the community's mindset about the different stages of a disaster with what is found in the literature,. Some people think that there are only two phase in disaster process, disaster and no disaster. In addition, a variable which is closely related to the disaster

management process has a low yield compared with other variables which has high related to daily living needs.

When referring to the theory used in this study, the study's results supports the statement of Chaskin (2001) on how the interaction aims to promote and maintain the welfare of society emphasizes the action initiative. The results also support Chaskin (2001) argue that the initiative is divided into two types, namely the individual initiative and collective initiatives. The individual initiative is the initiative that the idea comes from individuals and decision-makers in action lies in the individual, although this initiative will have an impact for the public. One example is a person who acts as a distributor of clean water. Costly water supply through the PDAM and unclean wells water is yet provided to make the person take the initiative as a distributor of clean water in Kemijen. Collective initiatives is the collective ideas of several individuals as outlined in the deliberations for the resulting agreement or a joint decision. One example is there are people felt sorrow for access to sanitary, therefore some people apply for aid when (discussion was held) *musrenbang* to the government related to the provision of communal toilet. Collective initiative is in line with theory that was purposed by Nakmofa and Lassa (2009), namely the increasing of sense of belonging, sharing the same disaster risks. Geographically, community is in the same location and they are vulnerable to disasters. It means, they have the same catastrophic risks, so that society take the initiative in meeting the needs of disaster management.

However, when we see in the earlier analyzes, local initiatives in Kemijen is largely shaped by individual initiative and only few things is formed by collective initiative. It shows that the flooding problems in Kemijen are not included as collective problem, meaning that the definition of sense of belonging, sharing the same disaster risk has not been established in most societies. Therefore, based on those issues, the accommodation is needed in reducing disaster risk in community-based institutional which is carried out by KSB Kemijen.

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